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UNITED STATES DEPARTMENT OF AGRICULTURE

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Contribution from the Office of Farm Management and Farm Economics

H. C. TAYLOR, Chief

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HAIL INSURANCE ON FARM CROPS IN THE UNITED STATES.

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INTRODUCTION.

The business of farming involves numerous risks. These risks may be minimized, if not wholly removed, by the application of principles of insurance. The insurance method of dealing with risks and losses is widely current among men in commercial pursuits. To the latter, insurance is now available, and very generally procured, against nearly every form of loss to which their business is subject.

The most common source of loss to the farmer is the partial or total failure of his crops. Hitherto, with negligible exceptions, the only form of crop insurance available has been that against loss by hail, and even this limited insurance coverage is of relatively recent origin. In the last few years, however, hail insurance has attained a quantitative importance that only those in close touch with the business have been in position to realize.

Hail insurance on growing crops is written in the United States by organizations representing three different groups of business institutions. These groups are: (1) Mutual hail insurance companies, which, with few exceptions, limit their business to the insurance of growing crops against hail; (2) joint-stock fire insurance companies, which write hail insurance on growing crops more or less as a side line; (3) State hail insurance boards or departments, under whose direction and control are administered State hail insurance funds.

During 1918, the latest date for which State insurance reports are available, the three groups of hail insurance organizations just mentioned had in force in the United States insurance on growing crops to a total amount of approximately $318,543,000, on which the premiums amounted to $17,631,000. The figures for 1919, as ascertained from correspondence with the companies and the State insurance commissioners, as well as from various unofficial published reports, show a remarkable increase, the total risks and premiums being approximately $559,134,000 and $30,330,000, respectively.

ORIGIN AND DEVELOPMENT.

The first organization in the United States to write hail insurance on growing crops, so far as official records reveal, was a small mutual concern organized in 1880 by the tobacco growers in Connecticut. This company, for some reason or other, dropped out of existence in 1887, but was promptly succeeded by another hail mutual organized in an adjoining county, which is still doing business. No other exclusive hail companies are revealed by official records earlier than the year 1889, in which year four mutual hail insurance companies were reported from North Dakota.

In the meantime one of the larger joint-stock fire insurance companies had begun to write hail insurance on growing crops. The first risks were written in Minnesota in 1883, while in the following year a small amount of hail insurance was also written by this company in what was then Dakota Territory, in Nebraska, and in Kansas. The State of Iowa and the Territory of Oklahoma were included in the hail insurance territory of this company in 1897, followed by Wisconsin, Texas, and Colorado in 1898.

Although many of these early mutuals proved to be short-lived experiments, by 1900 there were 37 mutual hail insurance companies in existence, located in seven different States, as follows: Connecticut 1, Wisconsin 4, Minnesota 13, Iowa 7, North Dakota 2, Nebraska 7, and Kansas 3. The total premiums and assessments collected by these companies during the year were approximately $643,000, and the losses incurred amounted to $407,000. More than one-third of the total hail insurance premiums were reported from Iowa, while Minnesota and Nebraska each reported more than one-fifth, Kansas somewhat less than one-sixth of the total, and the other three States smaller amounts.

In 1905 the total number of hail mutuals was still 37, those that had dropped out since 1900 having been replaced by new organizations. The total premiums of these companies during the year approached $800,000, and the losses were approximately one-half of the premiums collected. By this time at least one additional joint-

stock fire insurance company had begun to write hail insurance. The total hail premiums reported for these two companies in 1905 were approximately equal to the amount collected by the mutual companies, or about three-fourths of a million dollars.

By 1910 the total number of mutual hail insurance companies had decreased to 28, as against 37 in 1905. The total premiums for the year, however, showed a considerable increase, being more than $1,000,000. Of the hail mutuals reported by State insurance departments in 1910, one was located in Connecticut, five in Wisconsin, four in Minnesota, nine in Iowa, one in North Dakota, two in Nebraska, three in Kansas, two in Oklahoma, and one in Montana. Two of the Minnesota hail mutuals wrote insurance in Kansas and Montana, as well as in their home States, and one of these companies wrote also in North Dakota. In later years these same Minnesota mutuals have been doing business in several States, and a few of the Iowa companies have also been admitted to neighboring States.

At least five joint-stock companies were writing hail insurance on growing crops by 1910. The total hail premiums received by this class of companies for the year, so far as these figures have been obtained, were approximately the same as those reported for the year 1905, or about $750,000, though they exceeded this amount in some of the intervening years. During this five-year period, therefore, the mutual hail insurance companies had made a material growth, while the hail business of joint-stock fire insurance companies had been approximately stationary.

In the five-year period following 1910 the hail insurance business in the United States advanced by rapid strides. The number of mutual companies increased to 39. Their total premiums in 1915 exceeded $3,336,000, and were thus more than three times as great as in 1910. Although the mutual hail insurance companies thus made a material advance in the five years from 1910 to 1915, the hail business of the joint-stock fire insurance companies showed a far greater advance. The total number of such companies in the field increased from 5 to 35, while their total hail premiums in 1915 amounted to approximately $6,400,000, as against three-fourths of a million for 1910.

The year 1915, as will be brought out later in this bulletin, was an extremely severe one from the point of view of hail losses. A number of the mutual companies, as on various previous occasions, were caught without adequate reserves or other resources and had to prorate their losses. As a result, mutual hail insurance suffered a severe setback, this being particularly true in the State of Kansas. During the season of 1916 only 35 mutual companies were in the field, and the premiums collected by the mutuals in this year amounted to only about two-thirds the total premiums collected by this group of

companies in 1915. In the three years following 1916, however, the premiums of the mutuals again increased each year, reaching $4,775,000 in 1919.

During these same years the joint-stock insurance companies showed continued and rapid progress. The number of such companies writing hail insurance continued to increase, and their total premiums in 1916, as well as in 1917, exceeded $8,000,000. In 1918 the hail premiums of joint-stock companies on their business in the United States exceeded $12,850,000, and for 1919 the corresponding figure was approximately $19,460,000.

In the early days of hail insurance but little information existed as to the nature of the hail hazard and its relative severity in different localities. Many of the early hail mutuals appear to have been patterned on the local farmers' mutual fire insurance companies, without an adequate recognition, on the part of the organizers and managers, of the radical difference between the fire hazard in relation to segregated farm buildings and the hail hazard in relation to fields of growing grain. With a reasonable number of risks in a given locality, the law of average will apply to the losses of farm buildings by fire in a way that it can not possibly apply to the losses in the case of hail insurance on growing crops. Unlike fire, a hailstorm seldom, if ever, strikes one farm only but cuts a swath through a limited territory, resembling in its effects a conflagration in the case of urban fire risks. The fact that mutual hail insurance in the West North-Central States continued to increase in volume as well as in the number of companies writing it may be credited, therefore, to the need for such insurance on the part of the farmers rather than to any general success on the part of the mutuals offering this protection.

The causes of the frequent failure among the early hail mutuals can not be charged entirely, however, to lack of knowledge of the hail hazard. In many instances the failures were due to reckless or unscrupulous promotions, the organizers taking advantage of the general inadequacy of insurance laws, which were especially lax in regard to mutual companies. In cases of this kind the permanency or soundness of the company was frequently a minor consideration with the managers, whose direct object was prompt and liberal incomes from salaries and commissions.

Mutual promotions of the speculative type have tended to discredit all hail mutuals and have constituted a serious handicap to the growth and development of companies organized by men of ability aiming at real service to their constituents. To a somewhat less extent the same has been true of hail mutuals which were promoted by men who, while honest and sincere, were lacking in knowledge of the hail hazard or in ability as managers.

As time went on the nature and severity of the hail hazard in the different States became better known. Insurance laws, as well as the administration of these laws, became in general more effective in safeguarding the interests of the policyholders, and farmers to an increasing extent became aware that it is necessary to know something about the men in charge of the mutual organizations as well as to see that the plan on which insurance is offered is a reasonably workable one. Because of these changes in conditions ill-considered and speculative promotions of hail mutuals appear in general to have passed their climax in each State a few years after the organization of the first hail mutuals in the State. Such climax in promotions was reached in the State of North Dakota in the middle nineties, in Minnesota and Nebraska during the last few years of the past century, and in Iowa during the first years of the present century. In Oklahoma the promotion period centered about the year 1903, and in Texas it occurred nearly 10 years later. The State of Kansas presents an exception to the general rule, in that the period of most rapid promotion of short-lived companies came more than two decades after the first hail mutuals were organized. The earliest hail mutual in Kansas, as already stated, began business in 1889, but the climax in the promotion of hail mutuals in that State was not reached until the five-year period following 1910.

One of the most spectacular mutual hail insurance promotions that has occurred in any State took place in Missouri in 1919, and the organization in question is now in the hands of receivers. This company did not limit itself to hail coverage, however, but included destructive storms of whatever nature, and partly for this reason the risks assumed by it have not been included in the data contained in this bulletin.

The total number of mutual hail insurance companies of which record has been found, either from insurance reports or from other sources, is 121. Of these 121 hail mutuals, only 41 companies were in existence at the date of the most recent insurance reports. The other 80 hail mutuals have ceased operations, either voluntarily for lack of patronage or under pressure applied by State insurance departments. This relatively high mortality among the mutual hail insurance companies as a class has frequently been interpreted as proof of unsoundness and instability in every mutual hail insurance company, without regard to its individual record or merit. Such a conclusion is no more justified than would be a conclusion that all joint-stock fire insurance companies are unsound because of the large percentage of such companies that, for one reason or another, have gone out of business. No reliable figures are at hand for the total number of joint-stock fire insurance companies that have been organized in the United States. According to some of the best-known

insurance summaries which contain lists of companies that have failed or retired, however, at least six joint-stock fire insurance companies have gone out of business in the last 50 years for every such company now in the field.

Considered by States, the number of hail mutuals organized and the number now in existence are as follows:

North Dakota, 13 companies organized and 1 in existence; Minnesota, 25 organized and 7 in existence; Iowa, 18 organized and 6 in existence; Nebraska, 16 organized and 4 in existence; Kansas, 14 organized and 7 in existence; Wisconsin, 8 organized and 4 in existence; Oklahoma, 9 organized and 2 in existence; Montana, 6 organized and 2 in existence; Texas, 6 organized and 3 in existence; South Carolina, 2 organized and both in existence; Connecticut, Michigan, and New Mexico, 1 company organized in each State and each still in existence.

Of the hail mutuals that have ceased doing business, 11 companies were in existence for one year only, 38 operated more than one year but under five, while 20 operated five or more years but under ten.

In this connection the various ages attained by the 41 hail mutuals now in the field should be of interest. The approximate ages of these companies, by five-year periods, are indicated by the following summary of their organization:

1885–1889	2 companies.
1890–1894	2 companies.
1895–1899	6 companies.
1900–1904	4 companies.
1905–1909	7 companies.
1910–1914	5 companies.
1915–1919	15 companies.

The year 1911 marks the entry into the hail insurance field of the third type of business institution above mentioned, North Dakota in this year having put into operation its first State hail insurance law which provided for the writing of this form of insurance through a State hail insurance department. During the first year of State hail insurance in North Dakota premiums to the amount of $26,000 were collected, representing risks of slightly more than $1,000,000. The losses experienced during the year exceeded the premium income, however, by nearly 18 per cent, and the losses as adjusted had to be prorated at 70 per cent. The business during 1912 showed a relatively marked increase; the premiums amounted to nearly $65,000 and the risks were in excess of $2,500,000. During this year, however, the losses were nearly one and two-thirds times the total premiums, and for this reason had to be prorated on a basis of 55 per cent. These experiences discouraged the farmers from taking hail insurance with the State department, and the total business for

each of the next six years was less than one-half as great as that of 1912. During each of these years it was found necessary to prorate the losses, the percentages paid being as follows: 1913, 88 per cent; 1914, 65 per cent; 1915, 75 per cent; 1916, 38 per cent; 1917, 62 per cent; and 1918, 53 per cent.

The rather discouraging experience on the part of North Dakota with its State hail insurance department under the law as first enacted may be ascribed chiefly to two causes. In the first place, the premium charges provided for in the law were inadequate, such charges for the years 1911 and 1912 having been 20 cents per acre on $8 of insurance, making a rate of only 2½ per cent, or exactly one-fourth of the rate now charged by joint-stock companies in the State. In the spring of 1913 the law was amended so as to make the rate of premium 30 cents per acre on $8 of insurance, or 3¾ per cent, at which figure the rate remained until the complete revision of the law in the spring of 1919. The other outstanding cause of failure of the original North Dakota plan was that applications for insurance had to be made to the assessor in the early spring and the premiums for such insurance advanced at that time, before any crops were actually in existence.

In spite of this apparent failure of State hail insurance in North Dakota, the States of Montana and Nebraska enacted laws providing for State hail insurance departments in the spring of 1917. The Montana department began operations shortly after the law was passed, but no insurance was written by the Nebraska department until the season of 1918. The premiums collected by the Montana department during its first year of operation amounted to $107,000, and the losses incurred were moderate, being only $62,000. Although the law permitted a maximum assessment of 60 cents per acre, the department assessed and collected hail premiums of only 40 cents per acre on $12 of insurance, being at a rate of 3⅓ per cent. With the funds so collected the department was able to pay its losses, together with expenses of operation, the latter amounting to $4,700, and to complete the year with a surplus of $40,000. This favorable beginning of State hail insurance in Montana in 1917 was, however, followed by a very trying experience in 1918. The losses this year were extremely heavy, caused largely by a severe and unusually extensive hail storm just at the time when the wheat was ripe and ready for harvest. The losses as adjusted approximated $870,000. The maximum levy of 60 cents per acre brought only a little over $400,000, and this amount, together with the small surplus from the preceding year, was only enough to pay 46 per cent of the losses.

The Nebraska State hail insurance department during 1918, its first year of operation, collected $154,260 in premiums. The law in this case provided fixed rates which varied from 25 cents per acre for

the eastern part of the State to 45 cents for the western. The amount of insurance per acre was $10. The losses during the year proved to be moderate, amounting to only $127,060, and the total cost of administration was $6,072. All losses were, therefore, paid in full and the year was closed with a balance or surplus on hand amounting to $21,128.

During the early months of 1919 the States of North Dakota, Montana, and Nebraska materially amended their hail insurance laws. During the same months the States of South Dakota and Oklahoma also enacted laws providing for State hail insurance.

The new North Dakota law and that of South Dakota provide what is frequently called " compulsory insurance," although the term " automatic " would seem more accurately to describe the plan. In each of these States every acre of crop is now, without action on the part of the owner, insured against loss or damage by hail, the amount being $7 per acre in North Dakota and $10 per acre in South Dakota. In the latter State such owner may, however, exempt his land entirely from the operation of the hail insurance law by filing an application for exemption with the county auditor before June 1 of each year. He may also, if he so desires, retain one-half of the $10 insurance per acre and be subject to one-half of the indemnity tax. In North Dakota the owner of a growing crop may exempt such crop by filing a statement with the commissioner of insurance, except that a flat acreage tax of 3 cents per acre must be paid to the hail insurance fund whether the owner retains or rejects the hail insurance provided by the State.

In both the Dakotas hail insurance premiums are now collected by the State in a manner similar to that provided for the collection of taxes. The same is true under the laws as now existing in Montana and Nebraska. In the last two States, however, the State hail insurance takes effect only upon the application for such insurance by the owner or tiller of the land. The Oklahoma law, which was not operative in 1919, is similar to the Montana and Nebraska laws in providing for strictly voluntary or optional insurance and follows the original North Dakota law in requiring premiums to be paid in advance.

The maximum hail indemnity tax that may be levied in North Dakota under the existing law is 50 cents per acre or 7½ per cent of the insurance. The actual levy in 1919 was only 25 cents per acre, exclusive of the so-called acreage tax of 3 cents per acre. In South Dakota, where the regular amount of insurance per acre is $10, a fixed rate is applied for each of four different districts, into which the State is divided, these rates being, respectively, 35 cents, 40 cents, 42 cents, and 45 cents per acre. Such rates are not to be reduced until the department has a surplus or reserve fund of $2,500,000.

The Montana law, like the North Dakota law, provides a uniform maximum limit of assessment for hail indemnity for all parts of the State, such limit being fixed at $1.20 per acre for $12 of insurance. This maximum rate was actually applied in 1919 and proved sufficient to pay the cost of insurance and leave a small surplus.

The Nebraska law provides for three hail insurance districts in the State with fixed rates applying to each. The rates for these districts are 25 cents, 40 cents, and 60 cents per acre, respectively, when the amount of insurance carried is $10 per acre. The farmer may, however, take $15 per acre at one-and-a-half times the rate charged for $10 per acre. The hail losses in Nebraska during 1919 were heavy, and there was left but a small balance when losses and expenses were paid.

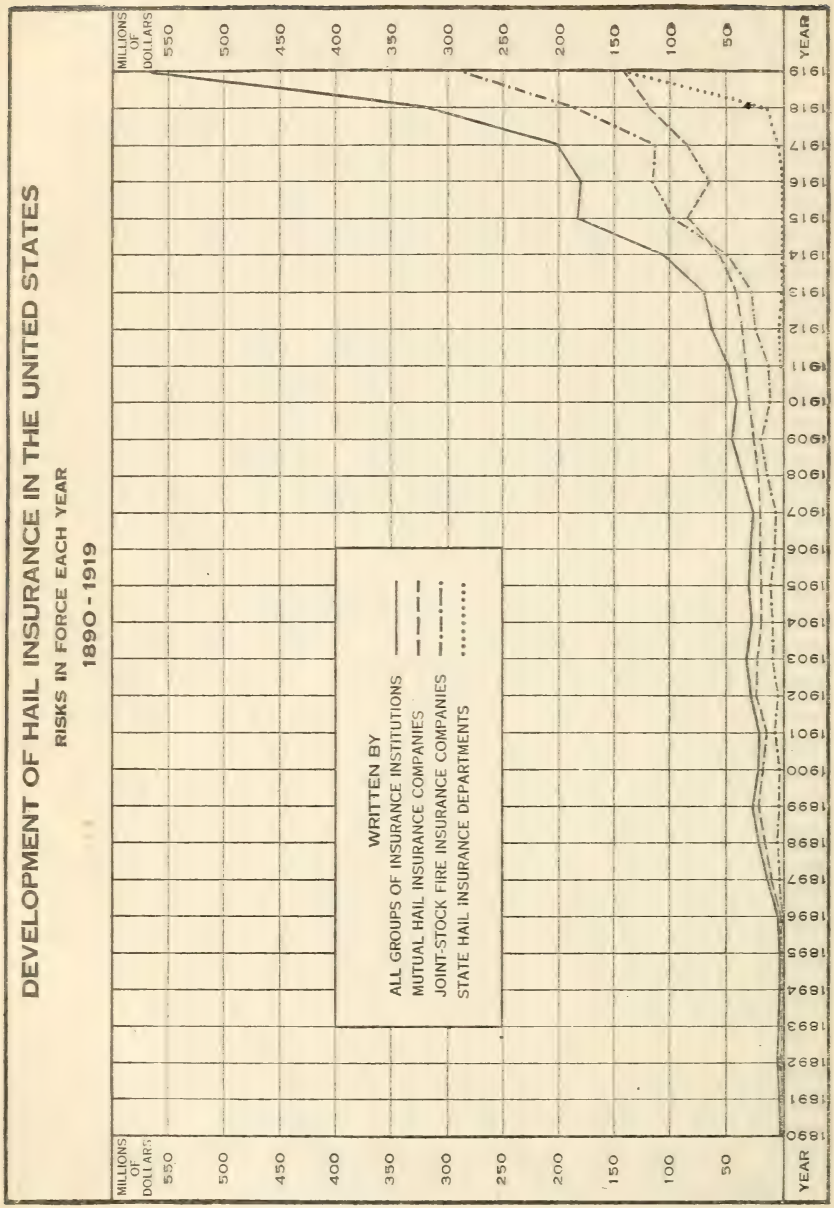
The Oklahoma law provides for the division of the State into four hail insurance districts. The insured may take any amount of insurance be desires up to $20 per acre. The rates are 3 per cent, 6 per cent, 7½ per cent, and 9 per cent of the insurance according to the district in which the crop is located. In each of the three States, where different rates for specified parts of the State are provided, the lowest rates apply to the eastern district and the highest to the western.

The total risks of the four State hail insurance departments in operation in 1919 were approximately $139,300,000; the premiums, $6,095,000; and the losses, $4,500,000. Of the total risks, North Dakota had about 62 per cent; South Dakota, 23 per cent; Nebraska, 14 per cent; and Montana, less than 1 per cent. The South Dakota department alone laid aside a material surplus or reserve from the year's business, such surplus being approximately $900,000.

As already stated, the total hail business in the United States during the summer of 1919 surpassed the already outstanding record of 1918 by a very wide margin. In fact, it is believed by many hail underwriters that the volume of this form of insurance written during the season of 1919 will not be equaled in the years immediately ahead. Certainly the record, as compared with those of earlier years, is a remarkable one.

While not all of the State insurance reports that give hail premiums and losses give also the hail risks involved, it is, of course, possible to arrive at approximate figures for the latter quantities by taking into consideration the amount of premiums and the average rates. Estimates for these missing figures have been worked out on the basis of such information as was available.

The development of the hail insurance business in the United States, as measured by the approximate amount of risks in force each year from 1890 to the present time, may be seen from figure 1. Besides showing the growth in the total hail risks, the figure also


DEVELOPMENT OF HAIL INSURANCE IN THE UNITED STATES
RISKS IN FORCE EACH YEAR
1890 - 1919
MILLIONS OF DOLLARS
550
500
450
400
350
300
250
200
150
100
50
YEAR
1890
1891
1892
1893
1894
1895
1896
1897
1898
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1900
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1902
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1904
1905
1906
1907
1908
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1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
WRITTEN BY
ALL GROUPS OF INSURANCE INSTITUTIONS
MUTUAL HAIL INSURANCE COMPANIES
JOINT-STOCK FIRE INSURANCE COMPANIES
STATE HAIL INSURANCE DEPARTMENTS

FIG. 1.

indicates the amount of risks and the annual increase in business for each of the three groups of insurance institutions already discussed, namely, mutual hail insurance companies, joint-stock fire insurance companies, and State hail insurance departments. The fact that the risks in force by mutual companies continue to exceed those in force by joint-stock fire insurance companies until the year 1916, while the premiums received by the two groups of insurance institutions change place at a considerably earlier date, is to be explained in part by the uniformly lower rates charged by the mutuals. The prime reason, however, is to be found in the fact that a large percentage of the mutual risks occurred in States, such as Iowa, Minnesota, Wisconsin, and Michigan, where the hail hazard is less severe than in the States farther west and where the rates and premiums are on this account relatively small in proportion to the volume of risks.

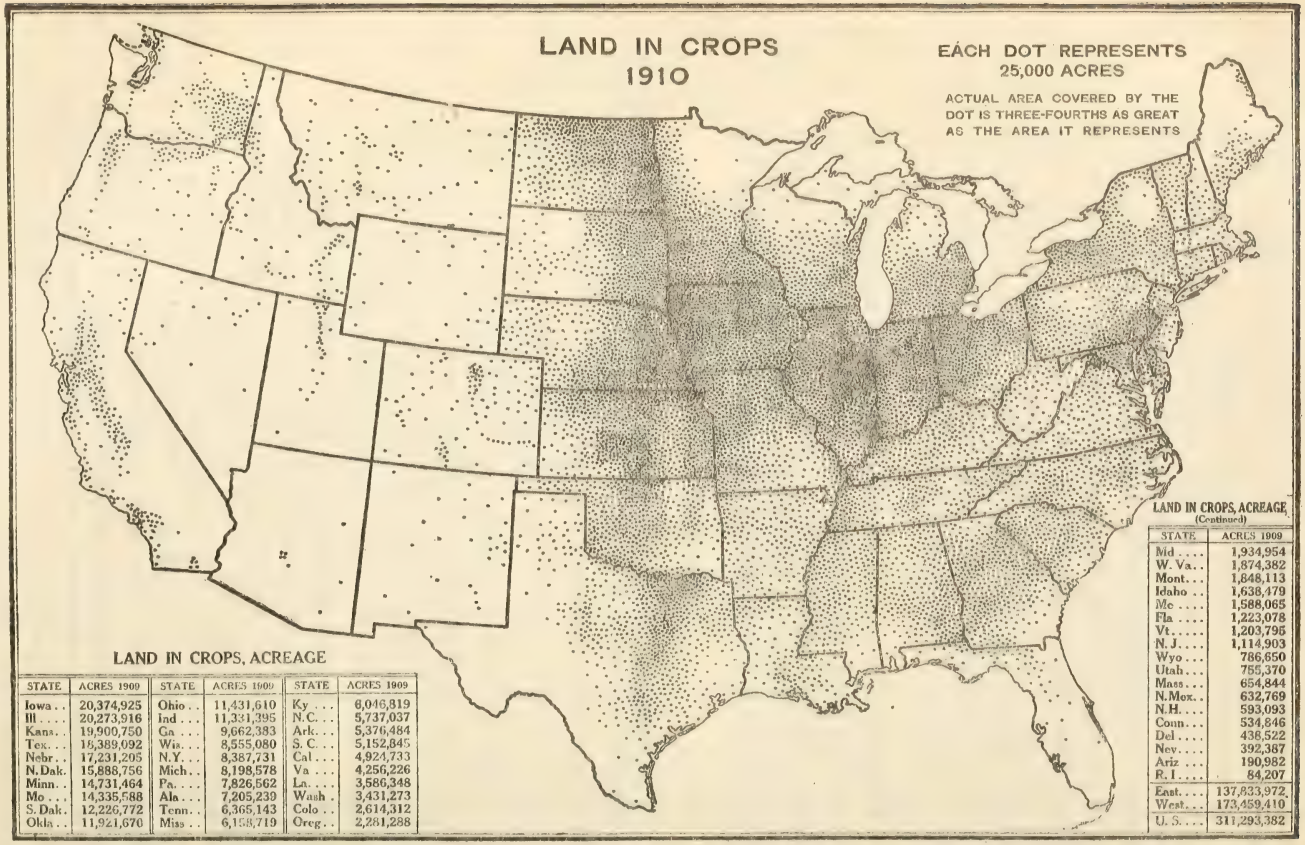
The total risks shown for 1919 represent those of 41 mutual companies, 43 joint-stock companies, and 4 State hail insurance departments. Of the $559,000,000 of hail risks in force during 1919, the joint-stock companies had almost exactly one-half, while the mutuals and the State hail insurance departments each had one-fourth.

TERRITORIAL DISTRIBUTION.

The territorial distribution of the hail insurance business is determined mainly by two factors, namely, acreage in crops subject to damage and the severity of the hail hazard in relation to other hazards to which crops are exposed. In other words, hail insurance in large volume can be written only where there is a large acreage of crops to insure, and where at the same time the probability of destructive hail storms is present in such degree as to make the growers of crops conscious of the need for protection. These two factors coexist in a marked degree in the West North Central States. While from the point of view of acreage in crops subject to damage when hail does occur, a large percentage of the area of about three-fourths of the States would be insurable, the hail hazard in a considerable number of these States is relatively so slight as to preclude the taking of any special precaution against loss from this source.

The acreage in crops in the different States, according to the census of 1910 is shown in figure 2.[1] Except for a few of the Western States, where there has been a marked increase in the crop acreage, this map represents the situation as to relative crop acreage in the different States very much as it exists at the present time. Later data of an accurate character will not be at hand until the results from the 1920 census are available.

[1] Reproduced from Yearbook of the U. S. Department of Agriculture, 1915, p. 340.



LAND IN CROPS, ACREAGE

STATE	ACRES 1909	STATE	ACRES 1909	STATE	ACRES 1909
Iowa	20,374,925	Ohio	11,431,610	Ky	6,046,819
Ill	20,273,916	Ind	11,331,395	N.C.	5,737,037
Kans.	19,900,750	Ga	9,662,383	Ark.	5,376,484
Tex.	16,389,092	Wis.	8,555,080	S. C.	5,152,845
Nebr.	17,231,205	N.Y.	8,387,731	Cal.	4,924,733
N.Dak.	15,888,756	Mich.	8,198,578	Va	4,256,226
Minn.	14,731,464	Pa.	7,826,562	La.	3,586,348
Mo	14,335,588	Ala.	7,205,239	Wash.	3,431,273
S.Dak.	12,226,772	Tenn.	6,365,143	Colo.	2,614,312
Okla.	11,921,670	Miss.	6,158,719	Oreg.	2,281,288

LAND IN CROPS, ACREAGE
(Continued)

STATE	ACRES 1909
Md	1,934,954
W. Va.	1,874,382
Mont.	1,848,113
Idaho	1,638,479
Me	1,588,065
Fla	1,223,078
Vt.	1,203,795
N. J.	1,114,903
Wyo	786,650
Utah	755,370
Mass.	654,844
N.Mex.	632,769
N.H.	593,093
Conn.	534,846
Del.	438,522
Nev.	392,387
Ariz	190,982
R. I.	84,207
East.	137,833,972
West.	173,459,410
U. S.	311,293,382

FIG. 2.

Some idea of the relative importance of the hail hazard in different parts of the country may be obtained from figure 3, which indicates in a general way the frequency of the occurrence of hail in the United States during the four months, May, June, July, and August. The data represented on this map are based on reports from the various United States Weather Bureau stations, and cover the 14-year period 1906–1919, inclusive. The map or chart in question, it should be emphasized, indicates only the average annual frequency of the occurrence of hail during the months stated, no attempt having been made to allow for differences in the severity or the destructiveness of hail storms. It should perhaps also be pointed out, as has been done by the Weather Bureau in connection with earlier published

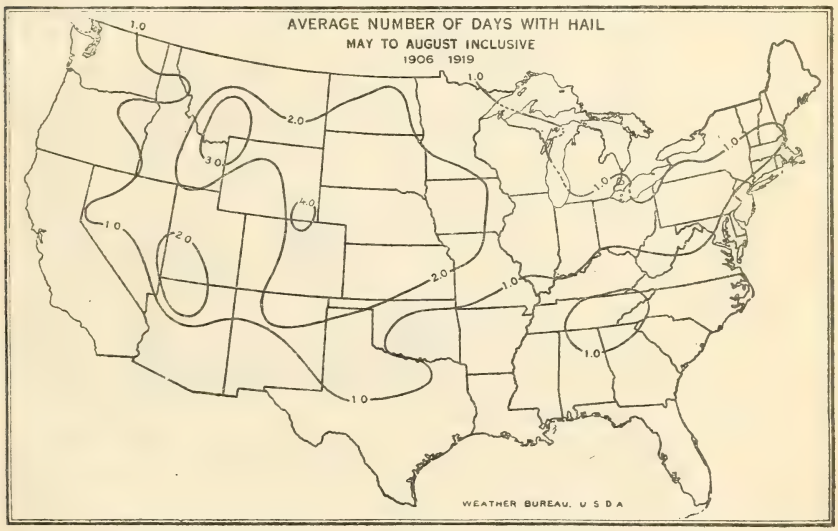


FIG. 3.

data on this subject,[1] that the reports on which the chart is based come from only 167 stations rather unevenly distributed throughout the United States. Since hail storms are frequently very local in character, it follows that the data as represented embody an element of chance even as to the average frequency of hail. It is probable, for example, that the total number of times at which hail occurred and, hence, also the average yearly number of such occurrences reported from a given station, may represent either more or less than the average frequency for all parts of the area for which such station is considered a center.

To a certain extent the relatively long period of time covered by the reports will, of course, tend to eliminate some of the chance elements involved in the lack of a sufficient number of reporting stations.

[1] See Weather Bureau Review for March, 1917, pp. 94 et seq.

It is quite probable, however, that the frequency indicated for the territory about Cheyenne, Wyo., for example, might have been equaled or even exceeded by other localities had all local areas in the relatively severe hail territory been represented. With all due allowance for these limitations, the chart doubtless indicates the prevalence of hail with a reasonable degree of accuracy.

The lines on the chart are intended to connect various points at which the average annual frequency of hail during the months mentioned and for the period indicated has been found to be equal or very nearly equal. Thus the lines marked 1.0 are intended to connect the places at which hail occurred on the average once each year during the 14-year period, while the lines marked 2.0 are intended to connect the places with an annual average of two occurrences of hail during the months considered, and so on.

The approximate distribution of hail insurance on growing crops in the United States during the year 1919 is shown in figure 4. The total of such risks in force was estimated to be $559,134,000. The circles on this map represent by their respective areas the relative amounts of hail risks in force in the various States. They also indicate by the sectors into which they are divided the group or type of insurance institution by which such insurance was carried. The sectors colored black in various circles indicate the part of the total hail insurance in a given State carried by mutual hail insurance companies; the checkered sectors indicate the part carried by joint-stock fire insurance companies; and the striped sectors, the part carried by State hail insurance departments.

As indicated by the map, the three States of Kansas, North Dakota, and Iowa, ranking in the order given, led all other States in the amount of hail risks in force. In fact, these three States together had more than one-half of the total hail risks in force in the United States. The approximate amount of risks reported from each of the three was: Kansas, $116,056,000; North Dakota, $99,603,000; and Iowa, $73,471,000. These amounts represent, respectively, 21 per cent, 17 per cent, and 13 per cent of the total risks in the United States. The States of Nebraska, South Dakota, and Minnesota follow in the order named having risks, respectively, equal to 9 per cent, 8 per cent, and 6 per cent of the total. The State of Oklahoma is seventh on the list, with risks equal to 4 per cent of the total. None of the remaining States had an amount equal to much over 2 per cent of the total, and most of them had less than 1 per cent.

With reference to the distribution of the risks between the three types of insurance institutions, it may be recalled from figure 1 that the joint-stock companies, in 1919, carried approximately one-half of the total risks, while the mutual companies and State departments carried about one-fourth each. The predominance of joint-stock hail insurance during the year in question may also be seen from figure 4.

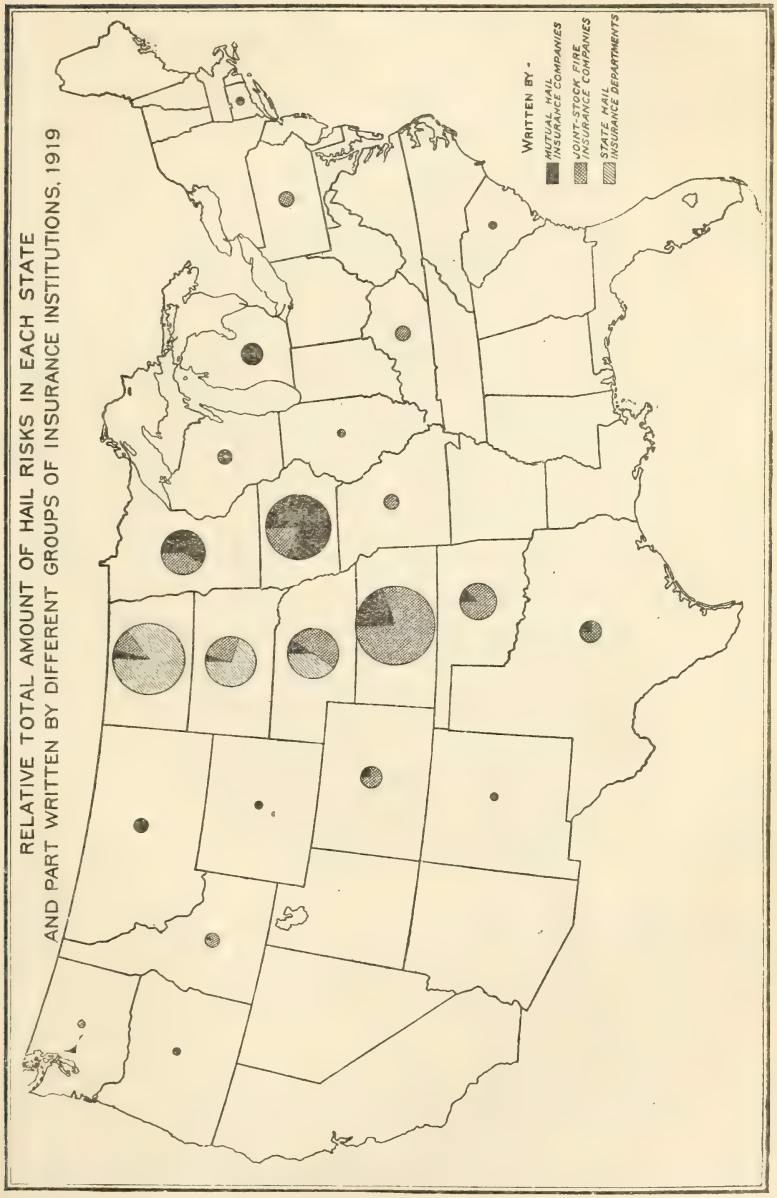

RELATIVE TOTAL AMOUNT OF HAIL RISKS IN EACH STATE
AND PART WRITTEN BY DIFFERENT GROUPS OF INSURANCE INSTITUTIONS, 1919
WRITTEN BY -
MUTUAL HAIL INSURANCE COMPANIES
JOINT-STOCK FIRE INSURANCE COMPANIES
STATE HAIL INSURANCE DEPARTMENTS

FIG. 4.

In the States of Iowa and Minnesota, however, the mutuals carried the major part of the total risk, while the same was true for the State hail insurance departments in two other of the more important States from a hail-insurance standpoint, namely, North Dakota and South Dakota. The map further indicates that in the State of Michigan all of the hail insurance of which record was found was carried on the mutual plan, while in the State of Wisconsin all but one-tenth of 1 per cent was carried on the same plan.

COST OF HAIL INSURANCE.

In hail insurance as well as in fire insurance it is, of course, essential that the rates of premium or assessment yield a sufficient income to cover the losses that occur and the necessary expenses of operation. In the case of joint-stock insurance companies, it is naturally the intention so to adjust the rates that in addition to losses and expenses there will be a margin of profit for the stockholders who have risked their money in the enterprise.

In the early days of hail insurance, as already stated, relatively little knowledge of the hail hazard was possessed by those engaging in the hail insurance business. It seems that a common rate of premium was 5 per cent of the insurance written. The variation in the severity of the hail hazard found in different States, as well as in different sections of the same State, was soon recognized, however, and the rates were adjusted in an effort to make them reflect these variations. Rates in Minnesota, Iowa, Missouri, and States east and south of these were lowered until a rate of 3 per cent became fairly general for the more common cereal crops in this territory. West and south of the States named, however, rates were gradually advanced for succeeding districts, reaching 6, 8, 10, 12, and even higher percentages of the insurance written.

While most of the mutuals started out strictly on the assessment plan, a few began operations on predetermined rates. Thus one of the Kansas mutuals which is still in the field at first wrote insurance anywhere in the State at 4 per cent. After a number of years of experience in the business this company graduated its rates according to the losses experienced, until such rates were only 2½ per cent for the southeastern part of the State and reached 10 per cent for some of the western counties.

The prevailing commercial rates for the year 1919 are shown in figure 5, the figures on this map representing dollars per hundred of insurance for the crop season. It will also be noticed that the relative heaviness of the shading or crosshatching on the map has been made to represent the relative hail rates for the different States or parts of States indicated on the map.

The rates here shown apply mainly to the more common cereal crops, namely, wheat, oats, corn, flax, and speltz. Grasses produced

for hay or seed are, however, usually insured at the same rates as the grains just enumerated. For barley and rye the rates in most of the States are 2 per cent higher than those shown on the map, and the same is true for corn where protection is desired against damage to the leaves as well as to the ear. Tobacco is given a rate varying from about one and one-half times the rates on wheat, oats, and corn in some districts to more than two and one-half times the rates on these cereals in other localities. The rates on cotton are even less closely related to the rates on cereals. In the South Atlantic and the East South Central States the rates for cotton are in general the same as the cereal rates, and in a few instances even 1 per cent lower. In the West South Central States, on the other hand, the hail rates for cotton are from 2 to 4 per cent higher than the rates for cereals.

In the extreme eastern part of the United States, as well as in the extreme western part, the rates on fruits and on garden vegetables, including peas and beans, even when raised as ordinary field crops, are in general from one and one-half to two times the rates on cereal crops. In parts of the West South Central and Mountain States these crops may be insured at a rate 2 per cent higher than the regular rate on cereal crops in the locality in question. The latter statement holds true for the North Central States also, except that such rates for this part of the country have usually covered garden vegetables only.

It is difficult to give any definite figures for rates of premium or assessment of mutual companies, since many of these continue to operate on the assessment plan without the application of fixed rates in advance. Where such rates are actually determined in advance by mutual companies they are usually somewhat lower than the joint-stock rates, although a few mutuals adhere to the commercial rates, returning a part of the premiums in dividends or rebates when the losses and expenses together are low enough to permit of such action.

Only fragmentary data are at hand for the average expense ratio of the various companies writing hail insurance. Such figures as are available, however, point to an average expense of operation equal to about 35 per cent of the premium. This expense of operation, calculated as a percentage of the premiums, will, of course, vary to some extent with the rates on the business written. Many overhead items of expense will be approximately the same for two policies, each representing a thousand-dollar risk, even though one be written in territory where the rate is 3 per cent and the premium $30 and the other in territory where the rate is 12 per cent and the premium $120. Six dollars of overhead expense attached to each of these policies will mean 20 per cent of the premium in one instance and 5 per cent in the other. Hence, to the extent that the expenses of

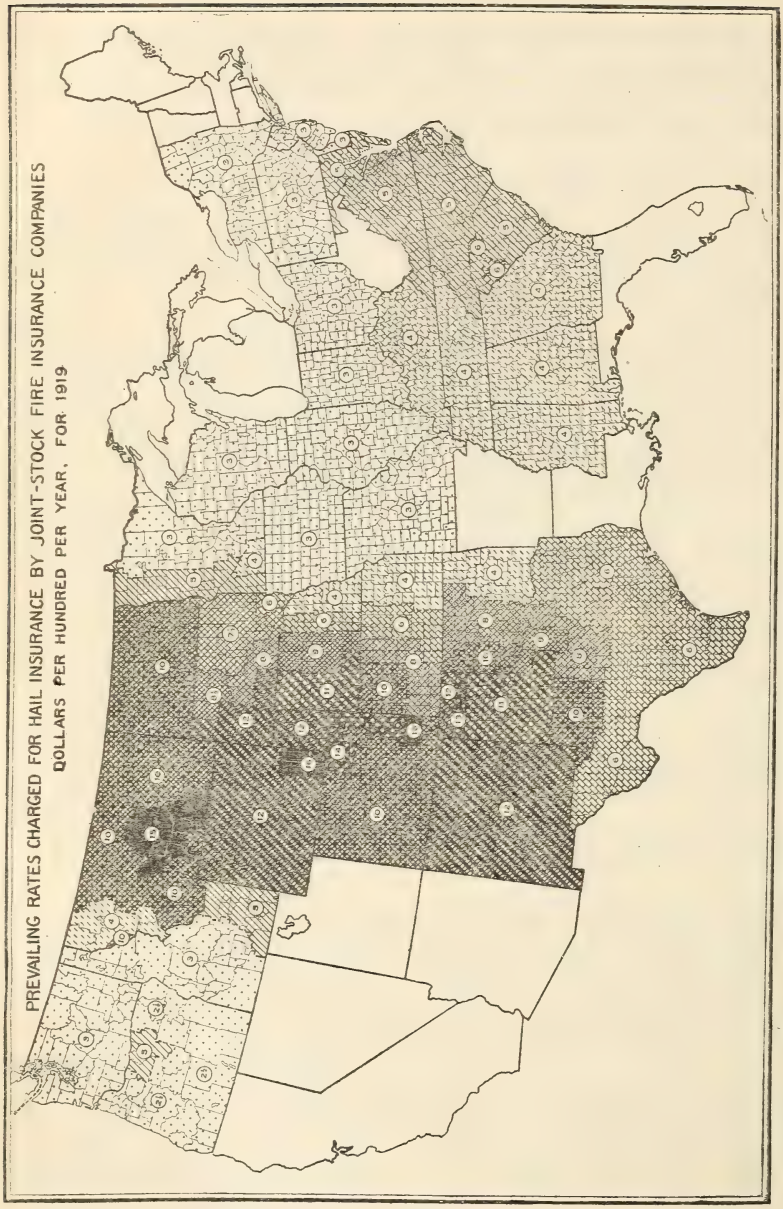

PREVAILING RATES CHARGED FOR HAIL INSURANCE BY JOINT-STOCK FIRE INSURANCE COMPANIES
DOLLARS PER HUNDRED PER YEAR, FOR 1919

FIG. 5.

operation are proportional to the number of risks rather than the premiums, the expense ratio should tend to vary inversely with the rate of premium. The biggest single item of expense in connection with an insurance policy, however, namely, the commission to the agent who solicits the business, is generally based directly on the premium collected and not on the number of risks written. While such commission in the case of hail insurance written at a predetermined rate is now very generally fixed at 15 per cent of the premium, formerly as much as 20 per cent of the premium or even more was paid for this service. Assessment mutuals pay their agents, as a rule, on the basis of risks written.

Some of the hail mutuals operating on the assessment plan limit the liability of their members and at the same time reserve to themselves the right to prorate their losses if the income from maximum assessments, together with any reserve on hand, proves insufficient to meet losses and expenses incurred. Other hail mutuals, operating, as a rule, in States where the hail hazard is less severe, write unlimited liability contracts on the plan followed by nearly three-fourths of the farmers' mutual fire insurance companies. Still other hail mutuals collect a fixed premium somewhat below the commercial rates for the territory in question, while the policy provides for a contingent liability on the part of the insured equal to the fixed premium. Under this plan the insured may in some years have rebated to him a part of the fixed premium already paid, while in severe years he may be called upon for a part of the obligation assumed under the contingent liability clause. This plan has been found desirable more particularly for territory where the hail hazard is severe and where annual advance-payment policies are the rule.

No matter which plan is used with reference to the contribution or liability to contribution by the insured, a wise and conservative management of a hail mutual demands that a reasonable reserve be provided in years when losses are relatively light against the years when relatively heavy losses will be incurred. This is, of course, the plan aimed at by the joint-stock companies, who neither reduce their charges nor give any rebate because a given year brings losses only half, or even less than half, of the average annual losses for the territory in question. No hail mutual operating on the fixed-premium plan should place its rates at so low a point that they will not amply care for an average loss experience for the territory, plus reasonable operating expenses, plus a fair contribution to the reserve fund. In a year of very light losses a part of the surplus premiums may, of course, be returned to the insured as a rebate; but before such rebate is declared a liberal addition to the reserve should be made. This plan should be adhered to until the company has on hand reserves equal to at least the average annual premium income. A hail mutual operating on the assessment plan should similarly add to its reserve fund each year in which its losses represent for its ter-

ritory an average loss experience or less. This may be done, of course, by a proper addition to the rate of assessment over and above what is found necessary to meet losses and expenses of operation during the favorable year. In the States where the laws governing mutual companies do not permit assessment mutuals to follow the plan above outlined, such laws should be amended in the interest of better insurance and of a higher degree of stability among the companies.

It is encouraging to note that the hail mutuals are to an increasing extent recognizing the principle above set forth. Complete figures for the reserves of these mutuals are not available, but 10 of the older and larger hail mutuals now doing business had a total of surplus or reserves at the end of 1918 amounting to nearly $920,000.

CHARACTERISTICS OF THE HAIL INSURANCE CONTRACT.

The characteristics of the hail insurance contract are perhaps most easily brought out by a brief comparison with the more familiar fire insurance contract. While the hail policy, as well as the fire policy, is generally considered a contract of property insurance as distinguished from life or casualty, there is a fundamental difference in the nature of the property covered by the two policies as well as in the hazards against which insurance is written.

Fire insurance is written, as a rule at least, on material things of value which are already in existence, such as buildings, stocks of merchandise, household goods, live stock, and various other forms of tangible wealth. Hail insurance, on the other hand, is written on growing crops which represent goods in prospect rather than goods in existence. In fact, the latter form of insurance expires almost coincidentally with the transformation of prospects of wealth into actual wealth, consisting of useful or marketable products.

While fire insurance is generally written for a specified period of time, hail insurance covers, as already intimated, the period or stage of development of crops. Most hail policies, to be sure, stipulate that the liability of the company shall definitely cease at a specified time, which, for most of the territory in which hail insurance is written, is noon on September 15. Other stipulations in such policies, however, provide that the company ceases to be liable as soon as the grain or other crop has been "cut or picked." Since the hail contract usually takes effect 24 hours after the signing of the application by the prospective insured even though the policy may not yet be executed, and terminates with the process of harvesting, it follows that in the case of the more common field crops other than corn left to mature on the root, the term for which the insurance is in force is measured by the period elapsing between the day following the date of application for such insurance and the date of harvest. No difference in the premium charges is made, as a rule, either because of the lateness of the date at which the insurance takes effect or the early maturity and consequent early harvesting of the insured crop. One risk may remain

insured twice as long as another without affecting the premium charges for such insurance.

All the joint-stock fire insurance companies, so far as known, limit themselves to a policy covering a specific crop growing on a designated piece of ground. The same is generally true of the mutuals operating west and south of Minnesota and Iowa. In the States just named, as well as in the States farther to the east, a number of the mutuals write a term policy for either three or five years and cover certain enumerated crops on a given farm. One very successful mutual, in fact, writes a perpetual policy which means, of course, that the insurance contract continues in force until canceled either by the insured or by the company.

While the disregard of the time element in the typical hail policy at first sight appears highly inconsistent, it is again, in part at least, explained by the peculiar nature of the objects insured. Even though hailstorms may be no more frequent or severe in the latter part of the season during which the hail policy is in force, the risk in the sense of probability of loss may be said in the case of most crops, at least, to increase rapidly as the time of harvest approaches. During the early stages of the growing crop the ravages of hail storms may cause a set-back merely, without materially affecting the final outcome or yield. As the crop develops, however, the possibility of such recovery becomes more and more remote and eventually disappears. Furthermore, a hailstorm occurring at the time when the crop is ready for harvest means not only that the damage wrought is irreparable, but a larger percentage of the stems of grain are actually broken, than would have been the case at an earlier stage. The heads on broken stems drop to the ground, while the heads on unbroken stems may have lost a part of their contents.

The difference between the hail policy and the fire policy, already pointed out, is based mainly on differences inherent in the objects covered by the insurance. Additional differences arise from marked dissimilarities in the hazards involved. The fire hazard originates in two kinds of underlying causes, namely, natural forces or agencies and bad or careless human actions. Of these two sources of the fire hazard the latter is beyond doubt the more important. In the case of hail insurance, on the other other hand, the hazard insured against originates entirely in natural forces over which man has no control. Most of the elaborate provisions against the so-called moral hazard, which are embodied in the fire insurance policy, therefore, have no place in the hail insurance contract.

While an individual whose crop is insured can not by his own action or lack of action bring about the occurrence of hail, he may, however, under certain circumstances increase the apparent loss due to hail by failure properly to care for a damaged crop after hail has occurred. There is also the possibility that the description of the acreage covered be made so inaccurate or misleading as to apply equally

well to more than one piece of land, or that the insured may otherwise either carelessly, or with intent to defraud, make misstatements in regard to the insured crop or the damage suffered thereon. These phases of the moral hazard are, therefore, guarded against in the hail policy as well as in the fire policy.

Because, in the case of hail insurance, the insured can not himself bring about the contingency insured against, slight consideration, as a rule, has been given to the question of overinsurance. While a maximum has almost invariably been fixed by each company on the amount written per acre, concurrent insurance purchased from other companies has until recently been given little attention. Hence, instances have occurred in which individuals have taken out insurance in several different companies on the same crop, making the total of such insurance greatly in excess of the value of any possible harvest from the acreage in question. Such a practice may, of course, be characterized as gambling in hail insurance and is no more to be defended than gambling in any other field of human activity.

Unless the locality in question happens to be peculiarly susceptible to hail and the premiums have not been adjusted to meet such conditions, the gambler in hail insurance is, of course, playing with a die heavily loaded against him. With fair "luck," however, it has been possible for individuals operating on this plan to pocket occasional winnings. Especially was this true before cooperation in the adjustment of losses came into practice among many of the larger writers of hail insurance.

The maximum amount of hail insurance per acre written by the individual company has been increased in recent years in response to the higher value of farm crops. While formerly $8 or $10 were common limits, nearly all companies operating in the Middle West, where the bulk of the hail insurance is carried, now write a maximum amount of $12 per acre on cereal crops grown on nonirrigated land and $25 per acre on the same crops grown on irrigated land. In some of the Eastern States $20 per acre is written on cereal crops by individual companies even though such crops are grown by the ordinary method. In the case of cotton such maximum usually ranges from $20 to $30 per acre, and in the case of tobacco and other crops requiring a considerable amount of hand labor, it reaches $100 or more per acre. Relatively little hail insurance has hitherto been written on truck or orchard crops and no fixed standards as to amounts per acre, or in many States even as to rates, appear to have been agreed upon by the companies.

While the hail insurance companies have thus placed a limit on the amount of insurance that they will individually write on a given acre, which limit is well within the probable value of the crop, concurrent insurance was formerly, as above stated, permitted to any amount desired by the insured. At present, however, most companies in the case of nonirrigated cereal crops prescribe a limit of

$40 per acre for such concurrent insurance, including the amount carried by the company in question. For similar crops on irrigated land the prevailing limit on total concurrent insurance is $75 per acre. Should the total concurrent insurance exceed these limits, each company will be liable only for its pro rata part of the maximum amount of insurance permitted.

The hail insurance contract as ordinarily written is a valued policy, the crop for adjustment purposes being literally valued at the amount of insurance carried per acre. In the case of a total loss by hail the indemnity due is the amount of insurance carried per acre, while in the case of a partial loss the indemnity due is such part of the insurance per acre as the part of the crop lost by hail is of the undamaged crop before the hailstorm occurred. Let it be assumed, for example, that an individual carries hail insurance on his grain in a given company to the amount of $12 per acre and that a hailstorm occurs and damages the crop. The problem of the adjuster under the prevailing type of hail policy is not that of ascertaining the actual amount by which the value of the crop has been reduced, but merely to ascertain the percentage of the crop which has been lost by reason of hail. If the estimated loss is equal to 50 per cent, or one-half of the crop, the insured is awarded indemnity equal to one-half of the insurance carried, or $6 per acre, while if it is found that three-fourths of the crop has been lost by hail the indemnity is $9 per acre. This holds true, no matter whether the actual value of the crop just preceding the hailstorm is estimated to have been greater or less than the amount of the insurance thereon, provided the crop was not so injured or damaged from any other cause or causes as to preclude a profit over and above the actual cost of harvesting, gathering, thrashing, and marketing. Should it happen, for instance, that one farmer whose field is insured at $12 per acre had in prospect a yield valued at $60 per acre, while the field of his neighbor, similarly insured, for one reason or another, promised a yield equal to but $6 per acre, and a hailstorm passed over the two fields, causing a 50 per cent damage, each farmer would receive $6 per acre, or one-half of the amount of insurance carried. One of these farmers would, of course, be paid only one-fifth of the actual loss suffered, or one-tenth of the value of the undamaged crop, while the other would receive twice the amount of his actual loss, or a sum equal to the entire undamaged value of his crop.

It must be admitted that the practices in hail insurance above referred to violate the frequently quoted principle of insurance, namely, that the contract involves indemnity for actual loss, and that no profit to the insured is contemplated or permitted. On the other hand, it would seem that to limit the indemnity on the basis of the reduced value of the crop preceding the occurrence of hail would give the company an unfair advantage unless provision were also made for the return of a part of the premium corresponding to the

reduced liability. Such a provision would, in practice, involve considerable difficulty, and the necessary adjustments, assuming that the plan were otherwise practical, would add materially to the expense of operation.

Barring some such additional change in the contract as just indicated, there seems to be no reason why the company should have its indemnity payments reduced on the ground that adverse conditions, other than the occurrence of hail, have reduced the value of the insured crop. The premium rates are fixed on the basis of the prevalence of hail in a given locality coupled with the susceptibility of the insured crop to damage from this hazard, and not on the basis of any probability of earlier loss from other causes. From this point of view it would seem that even the provision in the hail contract which denies liability in cases of earlier damage, from causes other than hail, to such an extent that the crop is not worth harvesting, should be coupled with a provision for the return of an appropriate portion of the premium in cases where the company uses its right to deny liability under this provision.

Where mutual hail insurance companies write a term policy covering specified crops on a given farm, the amount of insurance on a given acre will naturally vary with the total acreage of crops which are enumerated in the policy. The insurance per acre is ascertained under these circumstances by dividing the total amount of insurance or the face of the policy, by the number of acres planted to the kinds of crops which are covered by the insurance contract. Companies writing term hail policies have as a rule the same provision for the adjustment of losses as is in vogue with companies writing seasonal policies applicable to specific crops on specified fields. In a few instances, however, such companies adjust losses on a plan similar to that on which fire losses are settled, paying the actual estimated loss on each acre up to the amount of the insurance carried.

Provisions in the hail policy with regard to notice of loss, proof of loss, and the payment of the indemnity due are essentially the same as in the fire policy. No liability is assumed, however, for a loss which does not equal 5 per cent or more of the insurance on a given crop, and in case the insured reports a loss representing less than such percentage of the crop he is himself liable for the cost of investigating the claim for indemnity against such loss. This provision appears to be rarely, if ever, enforced. The payment of a partial loss does not terminate the policy, but reduces the liability of the company by the amount paid on such loss.

SPECIAL PROBLEMS IN HAIL INSURANCE.

Whether the specific, one-season hail policy is written, or the blanket term policy, certain peculiar administrative problems enter which are not present in fire insurance. The writing of the former kind of policy gives rise to a strictly seasonal activity, hail insurance rarely being purchased on this plan until after the crop is already

growing and giving promise of a fair harvest. This means that, in order to secure business in any considerable volume, competent solicitors must be employed during the relatively busy summer months, while the company has no employment for them after the hail-writing season ends except to the extent that the same men are also used as adjusters. The adjustment work, however, begins shortly after the hail-writing season opens and continues but a few weeks at the most after the acquisition of business has ceased. What is true of the field work in hail insurance is true to a considerable extent also of the office work, most of which is coincident with the writing of insurance and the adjustment of losses.

This seasonal nature of the business adds materially to the problems of administration as well as to the expenses of operation, it being obviously difficult, if not impossible, to attract efficient workers under these conditions without the offer of special inducements. In the case of most mutuals writing term policies the cancellations at the end of the first season are relatively large. Even in such companies, therefore, the risks in force during a given season rest to a considerable degree on policies written after the fields were giving substantial promise of harvest.

There is, of course, a considerable economy in the expense item of an insurance company resulting from term policies, providing the policies actually remain in force for the term contemplated. As a rule, this advantage, for reasons already indicated, has been only partially realized. Certain notable exceptions are to be found, however, a few mutuals having succeeded in making their membership practically as continuous as is the general rule in the case of farmers' mutual fire insurance companies. In such cases, as might be expected, the expense item of the company has been strikingly small and the total saving to the members has been correspondingly great.

A particularly difficult problem in the administration of a hail insurance company as compared with that of a company insuring isolated buildings and other farm property against fire, is to be found in the peculiarly erratic nature of the hail hazard, and the resulting wide variation in the losses experienced. In 1914, for example, the total hail premiums collected by all classes of insurance institutions in the United States approximated $5,558,000 and the losses were only $2,677,000, or 48 per cent of the premiums. The following year, 1915, the total hail premiums received amounted to about $9,752,000, while the losses incurred were $11,833,000, or over 121 per cent of the premiums collected. The summer of 1916 was again a season of severe losses for the hail insurance companies, as well as for the farmers who carried their own risks. The years 1917 and 1919 were both years of relatively small hail losses for the country as a whole, while 1918 was what may be termed moderate or approximately an average year. During the six years above mentioned the percentages of total hail premiums paid out for losses by

all classes of insurance institutions were, respectively, as follows: 1914, 48.2 per cent; 1915, 121.3 per cent; 1916, 87.3 per cent; 1917, 50.7 per cent; 1918, 63.7 per cent; and 1919, 47.8 per cent. With such variations occurring when the experience of all companies and organizations operating in a large number of different States is taken into account, including those operating on an assessment plan and whose premium income is adjusted on the basis of losses already incurred, it will be apparent that the loss ratio to be expected during any given year is highly problematical when the figures for a single company charging a fixed premium rate and operating in a severe hail district, are considered. More particularly is this the case when such company limits its field of operations to a relatively restricted area.

One of the larger mutuals operating in Kansas collected premiums during 1914 amounting to $108,459 and incurred losses of only $19.649, or a little over 18 per cent of the premiums. During the year following, 1915, the same company collected premiums amounting to $348,389 and incurred losses of $651,173, or nearly 187 per cent of the premiums collected. For the first of the two years mentioned this company was, of course, able to pay back to its members a substantial rebate, besides adding a considerable sum to its reserves. In 1915, however, only the accumulated reserve on hand, coupled with the fact that a considerable part of the risks had been reinsured, saved the company from being obliged to prorate its losses, since it collects a fixed premium without contingent liability. Most of the other Kansas hail mutuals, which also operated on a fixed-premium basis, were obliged to prorate their losses in the year last mentioned.

One of the joint-stock fire insurance companies writing hail insurance in Kansas in the year 1908 collected hail premiums amounting to $134,498 and paid losses amounting to $214,633, or 159 per cent of the premiums. In 1912, on the other hand, the same company collected hail premiums nearly as large as those of 1908, namely, $112,889, while its losses were only $39,653, or 35 per cent of the receipts. The State of Oklahoma has in recent years shown variations in hail losses quite as great as those of Kansas. In 1915, two of the joint-stock companies with a relatively large hail business in this State had loss ratios of 112 per cent and 192 per cent, respectively. In 1918 the same companies had loss ratios in the State of only 18 per cent and 30 per cent, respectively, and one other company with nearly $90,000 in premiums had a loss ratio of but 7 per cent. In 1916 one of the joint-stock companies operating in North Dakota collected premiums amounting to $206,424, and paid losses amounting to $245,767, or 119 per cent of the premiums, while in the following year the company had premiums in the same State amounting to $146,516 and paid losses of only $66,996, or 46 per cent. Even more extreme variations in loss ratio could, of course, be cited by giving the experience of companies with relatively small amounts at risk. One of

the smaller hail mutuals in Kansas, with a fixed-premium rate, had a loss ratio in 1915 equal to 259 per cent of the premiums.

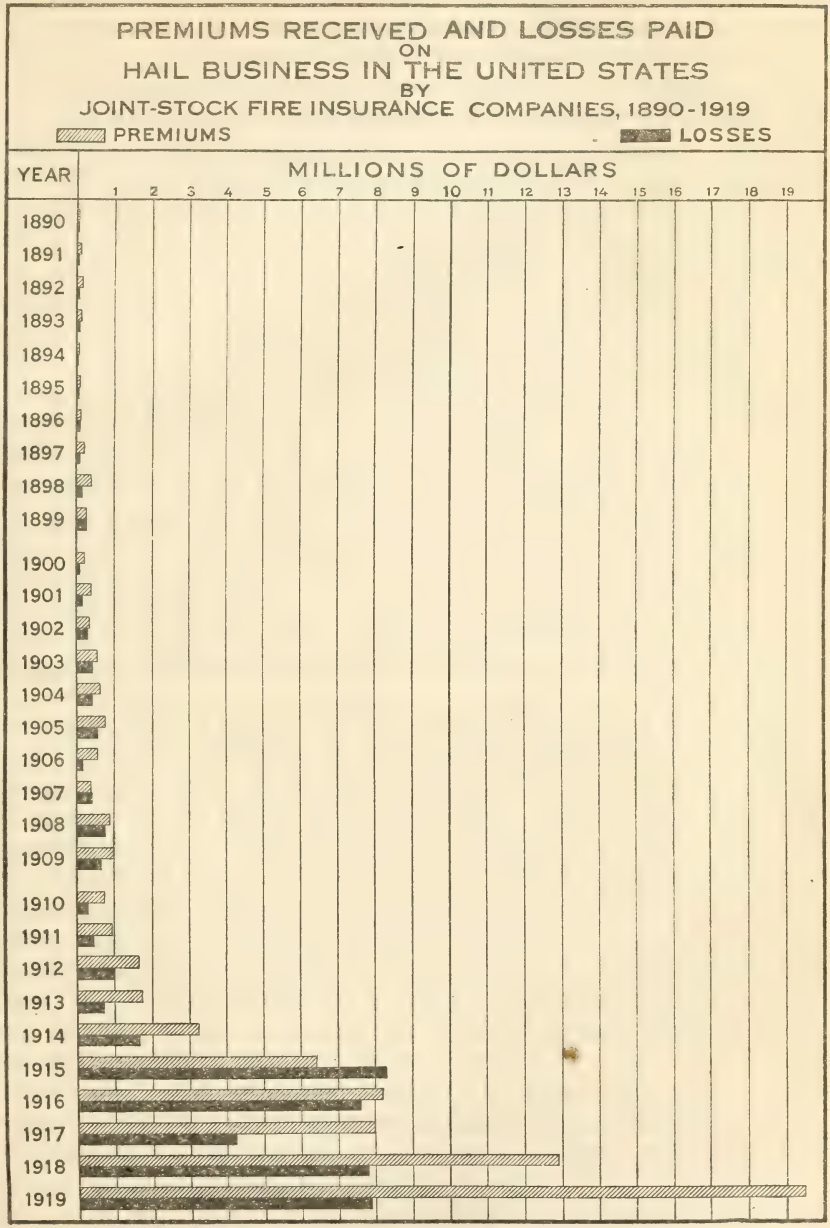


FIG. 6.

In connection with the phase of the hail business just discussed, figure 6, which shows the approximate hail premiums received and

losses paid by joint-stock fire insurance companies from 1890 to 1919, inclusive, will be found of interest. As indicative of the variation in the hail hazard from year to year, the figures for premiums and losses of the joint-stock companies are, of course, more significant than the corresponding figures for mutual companies.[1] Many of the mutual companies, as already stated, operate on the assessment plan, and hence their premium or assessment income expands or contracts each year in proportion to the losses incurred. In the case of joint-stock companies, while the rates have been frequently adjusted they have, however, been fixed in advance on the basis of past experience.

Figure 6. it should be noted, compares the premium income of the companies as a group, not with the cost of the business to them, but only with the losses paid. It is doubtful if any of the companies represented in these figures have had an expense ratio much below 35 per cent of the premium income. In the case of some of them, such ratio has certainly exceeded this figure. Assuming that on an average 35 per cent of the premiums has been required to cover expenses of operation. it would follow that the companies, as a group, have lost money during each year in which the actual losses, as indicated in the diagram. have exceeded 65 per cent of the premiums, and have made a profit during each year in which the loss ratio has fallen below this figure. The net profits in the hail business taken as a whole have by no means been as large as many persons have assumed. The last four years have been highly favorable, but many of the companies showed a net loss on their hail insurance experience at the close of 1916.

The variation in the destructiveness of hail in a given State depends. of course. to some extent upon the degree to which the land is given over to one or two commercial crops. Thus, Kansas and Oklahoma. for example. with their large winter-wheat acreage in proportion to the total acreage in crops, North Dakota and Montana with their similarly large spring wheat acreage. or parts of Texas with their cotton acreage. are likely to be subject to especially great variations. One or more bad hail storms occurring at a critical period in the development of the main crop in these States may. of course, ruin a relatively large percentage of the total crops on the farms in the territory visited by such storms. Even though during the next season equally severe hail storms occur. the damage will be far less in case such storms occur either before or after the critical period of the principal crop. The variation in the annual hail losses experienced by insurance companies in States where a single com-

[1] The figures represented in this diagram, as well as those given in the text, are as complete and accurate as it was possible to make them. An effort to supplement as well as to check up the figures given in the various published reports, by data secured direct from the home records of the companies, was only partially successful. While a large percentage of the companies, and among these the more important pioneers in the business, generously furnished all the data requested. other companies for one reason or another failed to do so.

mercial crop predominates is further heightened by the fact that this commercial crop is very generally insured by the farmer without including his other field acreage, thus causing hail risks of the insurance companies to be concentrated in a single crop to a degree even greater than are the farmer's crop prospects taken as a whole.

In States in which considerable diversification of crops occurs there will exist at no given time this high degree of susceptibility to damage from hail. In such States farmers more generally insure more than one crop. The critical period of one or more of these crops is likely to be past before that of other crops is reached. The total hail loss in such States, as well as the part of such losses covered by insurance will, therefore, tend to vary less from year to year than is the case in States where there is little diversification. However, since the amount of hail that falls and the angle at which it falls, depending upon the intensity of the wind during the hail storm, are uncertain and variable, as well as the time at which hail occurs, it follows that considerable variations in hail damage from year to year will be found even in States having a wide diversification of crops.

It should be apparent, therefore, that no insurance company can with safety assume a large volume of hail risks in a limited territory unless it has available assets in considerable amount. While this is especially true with reference to the tier of States composed of Texas, Oklahoma, Kansas, Nebraska, and the two Dakotas, as well as for the States immediately to the west of the tier, it is essentially true for all localities where hail constitutes a hazard severe enough to merit special attention. A new company, obliged to rely for the meeting of its obligations largely or entirely upon the premiums collected during the year, should see that the risks assumed are scattered over as wide a territory as circumstances permit. A limit must be placed on the acreage that may be accepted for insurance in any one square mile of area, in any one township, and, finally, in any one county. Even with restrictions of this kind carefully provided for and applied, the small, joint-stock company without accumulated reserves takes greater or less chances of direct failure, while the mutual hail insurance company, similarly situated, takes chances of having to collect unduly large premiums if operating on the unlimited liability plan, and of having to prorate its losses if operating on the fixed premium plan.

The mutual as well as the newly organized or small joint-stock company doing a hail insurance business must use every reasonable opportunity to build up a surplus or reserve fund. In the case of mutual companies, the mutualism must, in the case of hail insurance at least, be interpreted to embrace not only the members of the company during a given year, but must be held to embrace, to a considerable extent, the membership included for a series of years. Those who join the company in a year when the hail hazard happens to be unusually light, for example, must be willing to be assessed

an amount considerably greater than that required to pay the loss for that year and to leave a part of the funds which they have contributed in the reserve fund of the company to be used to supplement the premiums collected in years when the hail hazard happens to be exceptionally severe. Unless a mutual company follows this plan, it is quite certain, assuming that it is operating in severe hail territory, to have to prorate its losses in years of heavy hail damage.

There is, of course, no serious objection, either moral or legal, to the plan of prorating losses by a mutual company, providing all the members have joined with the understanding that such action may be expected in case the contributions to the company prove insufficient to meet the losses incurred together with legitimate expenses of operation. The danger, however, is that the solicitors of insurance representing the company, in their desire to secure new members and to earn commissions for themselves, will permit and even encourage the prospective insured to believe that the funds collected by the company are not only sufficient to meet all losses in full but that a rebate may reasonably be expected. Members entering the company with this understanding are of course sure to feel, when losses are prorated, that they have been the victims of misrepresentation and fraud, even though the policy specifically states that losses will be prorated in case such action is found necessary.

In any case, it has been the general experience of hail mutuals as well as of mutuals operating in other fields of insurance that whenever it has been necessary to prorate losses the membership in the years following such action has materially decreased. The management of the company is almost invariably blamed for the failure to settle in full, regardless of the facts in the case. Many companies have failed to survive the prorating of losses even where such companies were managed by men whose integrity was unquestioned among those who knew them personally.

Another problem in hail insurance which is not found to the same extent in fire insurance may be pointed out with particular reference to mutual companies. This difficulty, namely, that of democratic management and control of the company, arises from the fact that a hail mutual, as already stated, can not be operated successfully in a territory of small area. A possible exception to this rule may be made in the case of certain districts where the hail hazard is relatively light and where the insurance covers only one or two specified crops forming a minor part of the acreage of each farm.

With a fire insurance mutual operating in a limited area, a certain degree of real cooperation in management is possible. Each member resides within a reasonable distance of the place where the annual meeting is held, and is therefore in position to be present and to make his influence felt at such meeting in case he chooses. With the hail mutual, on the other hand, which very properly operates in an entire State, or perhaps in several States, it is not possible for the average

member directly to participate in the management, and hence the control of the company must of necessity be left to a relatively small group of men. Most hail mutuals, in fact, have their directors all living in the same locality, while the average member takes no part either in the annual elections or in the decision of other problems of management.

As yet another problem in hail insurance not to be met with in the same degree in fire insurance, may be cited the difficulty of determining the loss caused to a growing crop by hail. Frequently hail will occur before the crop has reached a stage at which its occurrence will result in permanent or material damage. At certain stages the entire crop above the ground may be entirely beaten down and the farmer claim a total loss, when as a matter of fact, with favorable weather conditions following the hail storm, a partial or even a complete recovery of the crop may take place. In other instances, the crops may have been partially damaged by certain plant diseases or insect pests before the hail occurred. Only an expert on these matters may be able to determine whether or not the damage pointed out by the claimant is directly due to the occurrence of hail or to the other natural agencies mentioned. When a difference arising between the company and the claimant for loss involves the extent to which a damaged crop will recover, the adjustment may be postponed until harvest by which time nature will in part have answered the question in dispute. When the difference, on the other hand, hinges upon the cause of the damage rather than the extent thereof, postponement of the settlement is likely to increase the difficulty rather than to remove it. Because of the greater uncertainty as to the amount of damage suffered by hail, it is considerably more difficult, as a rule, to satisfy the claimant for loss than is the case in fire insurance.

While unscrupulous adjusters have at times attempted to browbeat claimants and to settle for less than a fair indemnity, it is probable that in hail insurance as in fire insurance more losses have been overpaid than underpaid. Willfully unfair adjustments have at times been resorted to in order to injure or ruin a competing company and have resulted in profit to the claimant. A number of companies will, of course, carry risks in the same locality, and in the case of concurrent insurance two or more companies will be involved in a loss on the same field. A hail storm striking such a locality may cause total damage in some areas and partial damage in others. Certain companies operating in this territory will be found to have suffered a large number of heavy losses, while other companies will have suffered but few minor losses. The representative of an organization with only a few risks affected, knowing the situation in which the competing companies find themselves, may arrive on the scene promptly following the loss and make an extremely liberal adjustment with the few claimants against his company, paying perhaps three or four times the actual damage suffered. The same farmers

with whom he has settled, or in any case their neighbors, will expect and demand the same liberal settlement from the other concerns. Unless equally liberal settlements are made it will be difficult for these other companies to secure business in this locality in the near future. By this form of unscrupulous competition, losses in the past were often grossly overpaid, resulting in immediate injury to the companies affected and in needless increase in hail rates for the territory in succeeding years. The evil just outlined has been remedied to a considerable extent by an arrangement on the part of a large percentage of the joint-stock companies for a jointly maintained adjustment bureau.

Fair and reasonable adjustments, as well as economy in the operation of the business, are, in the long run, as much in the interest of the buyers of hail insurance as they are in the interest of the organizations engaged in this form of underwriting. This is true, no matter whether the farmers in a given State or locality patronize joint-stock companies, mutual companies, or State hail insurance departments. Extravagance, either in the adjustment of losses or in the expenses of operation, is quite sure to be reflected in increased premium rates or assessments. In the case of mutual companies, and more particularly those operated on the assessment or contingent liability plan, this relationship between expenditures and cost is very direct, and therefore apparent to every intelligent purchaser of insurance. The same may be said to be true with reference to State hail insurance departments. In the case of joint-stock companies the connection between expenditures and rates is somewhat less direct and is frequently overlooked entirely by the purchasers of insurance. The income from excessive rates may continue for a time to go to increased dividends to the stockholders or into the general surplus of the company, while a deficit, due either to some form of extravagance in expenditures or to rates which are actually inadequate, may be temporarily cared for by the surplus accumulated from the business of preceding years or from that of other lines of business during the same year. In the long run, however, no company is going to continue a line of insurance at an unremunerative rate, nor, in the face of legal regulation and of competition, actual or potential, is it probable that a company will long collect a rate greatly out of proportion to the necessary cost of the business. In hail insurance, as well as in other lines of underwriting, adequate rates of premiums or assessments are a first essential to true success. Excessive rates, on the other hand, whether caused by extravagance or cupidity, tend to discourage the buying of insurance on the part of many of those who need it, to reduce the volume of business and lessen the usefulness of the insurance institutions, and to place an unfair and unjustifiable burden upon those who do provide themselves with needed protection.

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